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ABSTRACT

Applied theories in the development of self-instructional, audio-video courses at Florida Atlantic University are explored in this article. Development of intralanguage and extralanguage associations of "verbal context" is proposed as a means by which the student might achieve a desired verbal-operant repertoire through self-instruction. The learning theories of B.F. Skinner and N. Chomsky are contrasted with emphasis on the distinction between the behavioral "chains" and the structural "strings" of forms. The specifications of the terminal behavior, items to be taught, organization of the presentations of the items, size and sequence of the steps, and reinforcement mechanisms are commented on in terms of programing procedures. (RL)

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A PSYCHOLINGUISTIC MODEL FOR SECOND LANGUAGE LEARNING:

NEW PROSPECTS FOR PROGRAMMED INSTRUCTION

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A PSYCHOLINGUISTIC MODEL FOR SECOND LANGUAGE LEARNING: NEW PROSPECTS FOR PROGRAMMED INSTRUCTION

Juan Estarellas

Programmed materials are increasing every day. Nevertheless, in second language learning programming is in a somewhat primitive stage. The variables affecting its development are many and conflicting. At present the greatest failure of programming seems to be its lack of success or ability to teach by total self-instruction language behavioral repertoires which will enable the learner to participate in the native community.

Programmed instruction is, in many ways, based on Skinner's theories of learning. Chomsky,[1] as well as some other linguists, [2] have criticized the Skinnerian concepts of functional analysis of verbal behavior on which programming is based. Chomsky tries to demonstrate that verbal behavior is too complex to be explained by behaviorist psychology and that verbal behavior cannot be predicted or controlled by observing and manipulating the physical environment of the speaker. But Skinner and other behaviorists deal with the function of language and development of language behavioral "chains", whereas linguists deal with the form or the strings of forms.

Essential to second language self-instruction skills, however, is the fact that "operant conditioning" provides for a classification of verbal responses and indicates how these responses can be strengthened by reinforcement to become verbal operants. Transformationalists explain linguistic rules and the acquisition of these rules by induction (something close to Field theories of learning). This theory looks immediately into the "whole", abstract and complex aspects of language and, at present, does not supply a very workable procedure for self-instruction in basic language skills. While the finding of transformationalists may provide the basis for linguistic models which will facilitate second language self-instruction, at present there is no such model.

Linguists should be more concerned with the "what" of language learning and psychologists with the "how". It has been unfortunate that some linguists have tried to set the tenets for the "how" before finding out more about the "what".

They have approached this problem with the complexity of a language system. The teaching of languages has been determined by linguistic theories, with complete disregard for the findings of psychology and little collaboration has existed between the two sciences. This accounts for the inadequacy of research in language by both sides and the inefficiency of language teaching at present. Still, present second-language programming reflects some of this background. Many programs are based on applied linguistics' assumptions, from the determination of sequencing based on the analysis of the learner's native and foreign language to the specification of the terminal behavior.[3]

In constructing a design for a programmed instruction course, there are certain major factors to take into consideration: the specifications of the terminal behavior, the items to be taught, the organization of the presentation of these items, the size and sequence of the steps, the reinforcement mechanisms, and so forth. Most programs reflect to a great extent the special philosophies, theories, even idiosyncrasies of the programmer or programmers. This aspect of programming is what may be called the "focus" of programming strategy. Undoubtedly the programmer can derive from applied linguistics the group norms for the verbal behavior on which to base the terminal behavior of the program; also from applied linguistic findings he should use the criteria for acceptable linguistic forms and sequences of linguistic responses. However, the "focus" of the program should be based on psycholinguistic theories and research.[4]

What Miller has called the "verbal context" provides a highly workable psycholinguistic focus for programming strategy to be used as a model. Verbal context is related to the interdependence of verbal units, and to the extent that a verbal unit is determined in a language by other verbal units. In brief, the verbal context of a verbal unit "is all the communicative acts which surround any specific verbal unit."[5] As Professor Skinner might say, the "verbal context" is the special conditioning by which verbal and non-verbal environment has reinforced any unit of verbal behavior to make it a verbal operant.

The concept of "verbal context" involves other concepts borrowed from communication theory, such as the amount of "information" carried by any of the units which form the message. Information is thus based on choice, and the amount of information of any verbal unit in a message is the range of possible alternatives that may occur. For instance, in the Spanish noun phrase la casa, casa carries less "information" than its English counterpart house, in the noun phrase the house, because casa indicates to a native speaker of Spanish that only a certain number of alternatives may occur in that position, namely, feminine and singular nouns, whereas in English, in the position of house, preceded by the, any noun, singular or plural, may be used. Information leads to "redundancy" and "redundancy" is simply when more symbols are used to encode a message than are theoretically necessary. All languages are redundant since the grammatical rules of a language are sources for redundancy.[6] For instance, in yo soy bueno in Spanish, yo is redundant, since soy already indicates that only yo can precede.

These concepts lead to a very important point: "control". Through information and redundancy messages can be controlled. The behavior of the encoder and decoder may also be controlled since their "verbal context" has been built and controlled by these mechanisms, sometimes verbal, and sometimes non-verbal. Verbal behavior is constrained by the audience, by the grammar, situation, needs, and experience. Because of this, language skills are programmable.

A comparison of language with semiotics may be useful at this point. In any communication process semiotics are involved. Semiotics, as Morris[7] has indicated, has its rules without which communication is impossible. The controlling rules are: 1) relation of signs to other signs; 2) relation of signs to designata; and 3) relation of signs to their users. Thus, the "sign context" of any sign, is its interdependence with other signs in order to convey a message, the relation of this sign to what it stands for, and finally, the environmental factors which reinforced the behavior of those who use the signs either in encoding or decoding. The information and redundancy of each sign in its context is what controls the encoder or

decoder behavior.

Language has different levels of signs. In the spoken language there are the phonemic, morphemic, and syntactic levels. In the written language there are letters, affixes, words, and sentence levels. When the learner faces a new language he is confronted with different kinds of semiotic systems, with different linguistic and psychological problems. Any sign has a tremendous amount of "information" for him and there is no "redundancy" at all.

In programming a second language, linguistics has emphasized the problems of interference, contrastive analysis, and the echoing of language patterns by means of intraverbal and other responses, while psychology has only furnished the principle of behavior control. In most cases the cooperation of both sciences has been the production of materials in which the learner is exercised in auditory discrimination of sounds, production of these sounds, and memorization of different structures commonly used by native speakers of the language by the constructed or multiple choice response techniques. Writing is taught as an afterthought and mostly in relation to words. Furthermore, due to the procedures used, programming cannot be evaluated properly inasmuch as the programs today use only echoic, transcription, textual, dictation, and intraverbal responses. The assumption that the verbal operants produced are mands or tacts is merely that of the programmer. Other responses might be reinforced in this way but tacts, as well as mands, need environmental reinforcement,[8] which is missing in all programs. It is expected that from one functional class the learner will transfer to another. For instance, from "ask for a pencil in French", he will produce the mand "Donnez-moi le crayon."; however, this is an intraverbal response since the reinforcing environmental factors are missing. This approach is not very conducive to the development of a "verbal context" for the learner. Besides, it does not make him aware of the "redundancy" of the language and the amount of "information" of the verbal units.

Most programs quickly move the students to syntactic structures with the purpose of making learning "meaningful" to the students, thus placing an immediate emphasis

on dialogs. These programs begin with the complexity of the language and do not make any attempt to build the syntactic structures link by link, to reinforce proper autoclitic behavior. They do not indicate and control the morphological, syntactic, and environmental cues which govern the different transformations in the code manipulation. Thus the difficulty of structuring intralanguage and extralanguage associations, and building behavioral "chains" for proper encoding and decoding behavior. Furthermore, all these programs place the emphasis of the mechanisms of control of verbal behavior on the language as a "whole", but not on the variables and factors of "communication". By this it is meant that they do not provide the necessary control of the "verbal context", to give the learner step by step the necessary controls which govern native speaking or writing in any semiotic level. Perhaps the best attempt made along these lines was made by Morton[9] with his use of "grammatical signals."

Up to the present the most that the best programs have been able to achieve in terminal behavior has been "formal repertoires", with a point to point correspondence between stimulus and response. That is, students know "how" to say but not "what" to say. Thus, there is very little chance for proper transfer to different environmental conditions. Knowing <u>what</u> to say, or being able to produce responses without formal correspondence but controlled by a common set of variables, is being able to respond appropriately to the nature of the stimulus conditions. These in brief are, "thematic repertoires", which can be achieved in programming, provided that the variables of media, content, and technique are related to the focus of building the "verbal context".

Programming is not far away from a combination of formal and thematic repertoires as a realistic terminal behavior. Based on the above discussion a psycholinguistic model for second language learning which would produce a combination of these repertoires should begin by teaching the two related levels of signs, -- phonemes and graphemes. This can be accomplished by using aural discrimination and dictation responses, and other similar techniques involving the use of redundancy.

This approach makes the learner aware of the amount of information of each sign. The learner should not be allowed to proceed until he has mastered the "verbal context" of the phonemic and graphemic level. It is only in this way that behavioral links for the language "chain" can begin to be formed.

Syntactic structures can also be taught by building step by step, or "link" by "link", the controls of the "verbal context". Environmental reinforcement for further redundancy purposes can be applied by programming TV, and turning TV into an individual teaching machine by the use of the dial-access mode.[10] Emphasis should be placed first on morphological relationships in the building of noun phrases, verb phrases, and so forth. Teaching should be based on learning in context -- for instance, asking the student to make a relation between determiner and noun in relation to a picture; the next problem would be the production of the whole noun phrase at the appearance of a picture. This will be the beginning of tacts while mands can be taught by asking the students to request objects or actions in normal environmental verbal communication. For instance -- ask the gentleman to pass the bread -- the student asks the question -- the next frame would give reinforcement by showing the gentleman in the act of passing the bread.[11] Many situations like this can be organized to further develop for the learner the intralanguage and extralanguage associations of the "verbal context" which will lead to a truly verbal operant repertoire by self-instruction.

These theories have been applied in my development of self-instructional audio-video courses now in use at Florida Atlantic University and other schools. It is interesting to notice that some concepts from transformational grammar work very well with this approach. However, the greatest handicap in this work has been the lack of a systematic body of linguistic facts on the target languages, especially at the syntactive level. The data obtained by these experiments[12] may open new directions for programming languages and prove valuable for the construction of pedagogical grammars for self-instruction.

1. N. Chomsky, "A Review of B. F. Skinner's Verbal Behavior," (New York: Appleton-Century Crofts, Inc., 1957) in Language, 35, 1 (1959), 26-58.

2. See for instance P. A. Luelsdorff, "Programmed Instruction and Language Learning," Philippine Journal for Language Teaching, 3, 34, (October, 1965), 26-45.

3. See H. Lane, "Programmed Learning of a Second Language," International Review of Applied Linguistics, 2, 4, (1964), 252-253.

4. A similar point, although for a different purpose, was made by J. B. Carroll in "The contributions of Psychological Theory and Educational Research to Teaching of Foreign Languages," in A. Valdman (Ed.) Trends in Language Teaching, (New York: McGraw-Hill Book Company, 1966), 104.

5. G. A. Miller, Language and Communication, (New York: McGraw-Hill Book Company, 1951), 81.

6. For further details on these concepts of communication theory see C. Cherry, On Human Communication, (New York: John Wiley and Sons, Inc., 1957) 115ff and 226ff.

7. C. Morris, Foundations of the Theory of Signs, International Encyclopedia of Unified Science, I, N. 2 (Chicago: University of Chicago Press, 1938) 6.

8. See B. F. Skinner, Verbal Behavior, (New York: Appleton-Century-Crofts, Inc., 1957) 35ff and 81ff.

9. F. R. Morton, The Language Laboratory as a Teaching Machine, (Ann Arbor: Publ. University of Michigan Lang. Lab. Series Preprints and Reprints, Vol. I, 1960).

10. For an explanation of a machine of this sort see, J. Estarellas and T. F. Regan, "Tomorrow's Language Lab Today," The Florida FL Reporter, 4, 2, (Winter, 1965-66) 3-4.

11. For further details of how this programming can be done see J. Estarellas, "Programmed TV Instruction in a Foreign Language" (Norwalk, Conn.: Continuous Progress Education, Inc., April, 1966). Also J. Estarellas and T. F. Regan, "Programmed TV A New Teaching Machine", Audiovisual Instruction, 12, 3, (March, 1967) 270-272.

12. For some of this data see J. Estarellas and T. F. Regan, "Effects of Teaching Sounds and Letters Simultaneously at the Very Beginning of a Basic Foreign Language Course," Language Learning, 16, 3 and 4, (1966), 173-182. Also J. Estarellas, "Applications of Psycholinguistic Theory to Foreign Language Teaching" (Norwalk, Conn.: Continuous Progress Education, Inc., February, 1966) and "AVIRS and Technological Instruction: Experiences with the New Educational Revolution." (Norwalk, Connecticut: Continuous Progress Education, Inc., August, 1966).